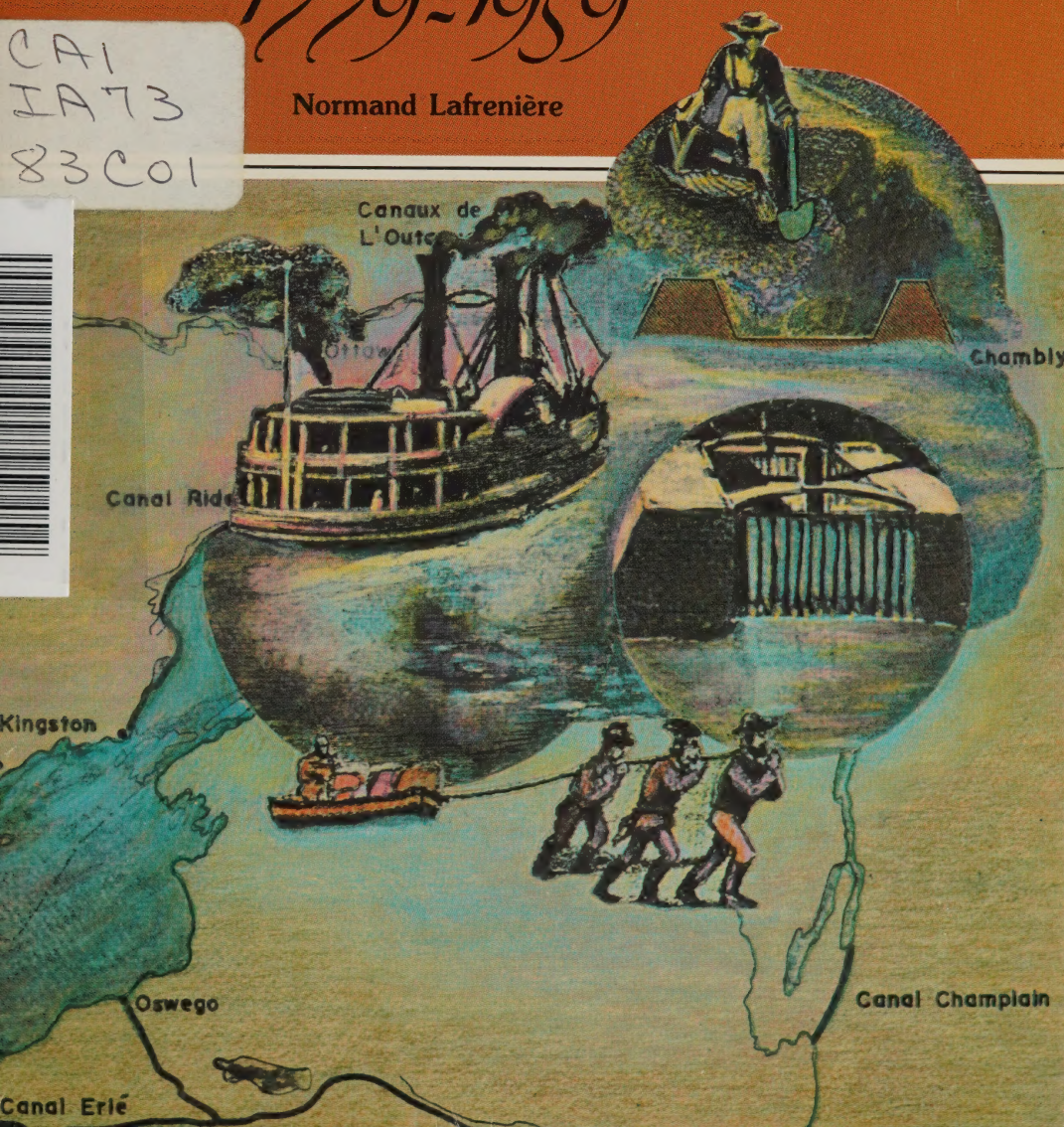
Coteau-du-Lac national historic park series, booklet nº 1

# Canal Building on the St-Lawrence River

## two centuries of work 1779-1959

Normand Lafrenière





Parks Canada Parcs Canada



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**Note:** *The imperial measures used to describe the canal structures are original. The equivalent metric measures were added.*

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# INTRODUCTION

During the 1960s, studies dealing with the Coteau-du-Lac Historic Canal have focussed mainly on the association of the military and the fortifications that had the mission to protect that means of communication in times when relations with our neighbour to the South were a lot more difficult.

Then came a period when research tried to find more on the commercial role the various canals that lined the St. Lawrence played in our national history. This commercial axis, which has been in constant evolution since 1779, came to be a real fluvial system of navigation. In fact, leaving aside the few attempts that were made to build canals under the French regime, 1780 is significant as the year the first lock canal in Canada, the Coteau-du-Lac Canal, was opened, and 1959 marks the inauguration of the existing Seaway. In the intervening years, four canal systems succeeded one another on the St. Lawrence.

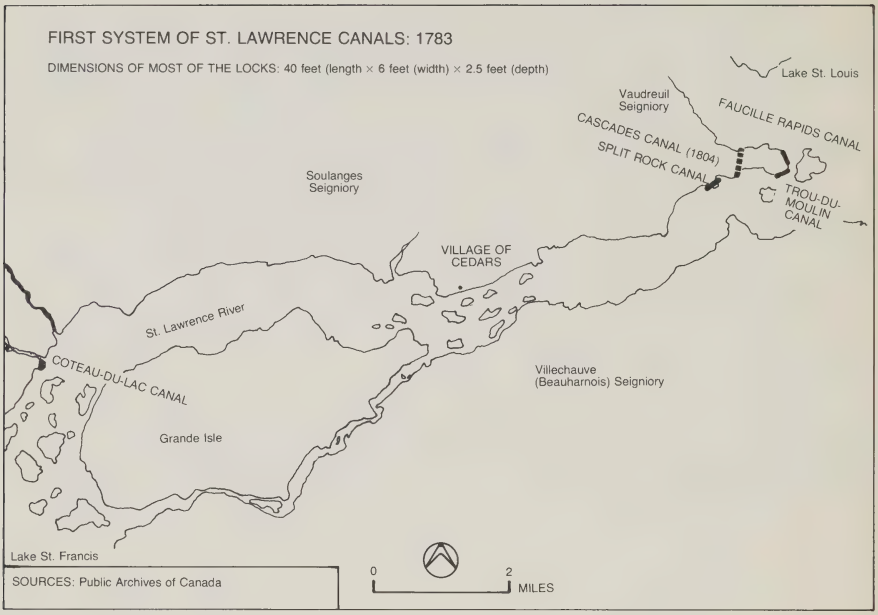
# THE FIRST CANAL SYSTEM 1779-1783

Since the canoe was very light, it could easily be portaged around rapids. (PUBLIC ARCHIVES OF CANADA)

## THE FIRST ATTEMPTS TO BUILD CANALS

Under the French regime, the Sulpicians of Montreal were the first and probably the only individuals to attempt to overcome the Lachine Rapids between 1689 and 1701. Lack of funds brought their work to a halt with their canal only two-thirds completed when they abandoned their project in 1701. In 1781, M. Pouchot, who was the commander of the Niagara and Lévis forts, mentionned the existence of a man-made channel at the Lachine Rapids, created with a chain of large rocks placed parallel to the riverbank to facilitate the passage of boats. The structure cannot be the remnants of the Sulpicians' canal-building endeavours, for their work was carried out far from shore. Moreover, Pouchot tells us that there were four or five others of these man-made channels upstream from Montreal. It would appear that these channels were built only a few decades before the first canals on the St. Lawrence.

A century was to elapse before the Sulpicians' ambitious undertaking was imitated; the military chose the section of rapids at Coteau-du-Lac, 48 km upstream from Montreal to built their first canal. Why was canal-building neglected for so long, considering that the river was literally afroth with rapids from Lachine to Kingston?


FIRST SYSTEM OF ST. LAWRENCE CANALS: 1783
DIMENSIONS OF MOST OF THE LOCKS: 40 feet (length × 6 feet (width) × 2.5 feet (depth)
Lake St. Louis
Vaudreuil Seigniory
FAUCILLE RAPIDS CANAL
CASCADES CANAL (1804)
SPLIT ROCK CANAL
TROU-DU-MOULIN CANAL
Soulanges Seigniory
VILLAGE OF CEDARS
St. Lawrence River
COTEAU-DU-LAC CANAL
Villechauve (Beauharnois) Seigniory
Grande Isle
Lake St. Francis
SOURCES: Public Archives of Canada
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MILES

## ECONOMIC CONDITIONS AND POPULATION

First off, the fur trade, which accounted for more than 76 per cent of Canada's total exports in 1770 and 51,4 per cent in 1788, was extremely well-suited to canoe travel for the transportation of furs upstream from Montreal. Since canoes were very light, they could easily be portaged around rapids on the upstream journey and could negotiate the rapids without too much difficulty on the downstream journey. In addition, colonization of the St. Lawrence valley did not extend beyond the Soulanges and Villechauve seigniories, both of which were sparsely populated at the time. However, at the end of the 18th century, military considerations prompted by the American Revolution were to alter requirements radically.

## IMPACT OF THE AMERICAN REVOLUTION

In 1775, the same year in which a Congress of most of the American colonies acknowledged they were at war with the British motherland, the American army invaded the province of Quebec by way of Lake Champlain under General Richard Montgomery and by way of the Chaudière River under General Benedict Arnold. Montreal was rapidly beseiged; however, a happy turn of events, resulted in Arnold's troops being repulsed at Quebec. When the American troops encamped at Montreal, learned of the setback, they decided it would be best to return to their own territory. Even though the Americans had withdrawn, British administrators had learned a hard lesson from the battles at Quebec and Montreal. The engagements had placed in sharp relief Canada's weakness with respect to transport.

Hence, during the term of Governor Frederick Haldimand, all matters pertaining to the defence of the country were re-examined, for the threat of another American attack persisted. To assist him in his task, Haldimand enlisted the services of Lieutenant Twiss, commander of the Royal Engineers, and Thomas Carleton, commander of the Montreal garrison. Beginning in 1779, the three men set about planning the first canal system. However before it became the site of the first canal, Coteau-du-Lac was the site of a military equipment wharehousing complex that was to supply the garrisons of the Great Lakes. That same year Twiss suggested to dig a canal in order to improve the logistics of the military supply system. On this subject, the historian Paul Villeneuve maintains that the role of the Coteau-du-Lac station was to have been of ensuring rapid liaison much more than one of serving as a primary defence point. He notes that even the two blockhouses erected in 1779 were used as warehouses and sheds and that their location near the canal was consistent with this subsidiary function.

This is a clear indication that one of the purposes of the Coteau-du-Lac fort and canal was the rapid provisioning of Fort Frontenac (Kingston) and the other forts located in the Great Lakes area. In this study, Villeneuve does not discount the interplay of certain commercial interests; he states that pressure brought to bear at the time by Montreal merchants may have hastened the completion of the project, especially since Carleton issued a war measure in 1777 stipulating that the transportation of commercial goods was to be the responsibility of the provincial navy.

## DESCRIPTION OF THE FIRST CANAL SYSTEM AND ITS COMMERCIAL USE: 1779-1783

A series of rapids concentrated mainly between Lake St. Louis and Lake St. Francis made the St. Lawrence impossible to navigate and this section of the river was also the one which posed the most problems to navigation because the difference in water levels over the 12,8 km stretch totalled 25,6 m with a grade of 1,9 m per km, which made for the steepest climb on the St. Lawrence. It is not at all surprising that the military sought first to improve the section between Lake St. Louis and Lake St. Francis.

The Cascades Rapids around 1807.
(PUBLIC ARCHIVES OF CANADA)

One of the Cascades Rapids locks around 1820.
(PUBLIC ARCHIVES OF CANADA)

Thus the first canal to be brought under construction by Captain Twiss was the one at Coteau-du-Lac, which took from 1779 to 1781 to complete. Nine hundred feet long (274,32 m), the canal comprised three locks, each of which was some 40 feet long (12,1 m), 6 feet wide (1,8 m) and two and a half feet deep (76,2 cm). At approximately the same time, military installations such as two blockhouses, two warehouses and a few wood buildings were added to the canal site. Convinced that certain Montreal merchants involved in commerce with the West would be interested in the canal, Haldimand instructed the engineer in charge of construction, Captain Twiss, to tell them what he had in mind. As early as 1781, he informed the merchants that they could use the Coteau Canal, and other canals which were soon to be completed, in return for 10 shillings by "batteau". The merchants were quick to accept the offer and, that same year, revenues recorded at the Coteau Canal were in line with Twiss' forecasts. While Twiss had anticipated receipts of between 100 and 160 pounds sterling a year, the total recorded was 132 pounds sterling and 5 shillings for the first year of operation. Unfortunately, this statistic gives us only a vague idea of what total traffic was for the Coteau Canal in 1781, because military vessels were exempt from the toll. However, a letter written by Twiss in December 1781 specifies, with regard to the commercial use of the canal, that more than 263 "batteaux" as well as two canoes and one small craft had gone through the canal.

Though the Coteau Canal was used to the full from the time it opened, it solved only some of the navigation problems upriver of Montreal. In 1783, three other canals were built to supplement the one at Coteau-du-Lac. The first canal was located at the Faucille Rapids, a short distance upstream of Cascades Point. It was 400 feet long (121,9 m), 6 feet wide (1,8 m), and contained one lock. A second canal of the same size was located at Trou-du-Moulin, next to a mill which belonged to the Baron of Longueuil. It was formed by a 200 foot long (60,9 m) channel and did not contain a lock. At Split Rock, builders made use of a natural trench in the rocky bank. Within this 200 foot long (60,9 m) passage was built a lock, the walls of which were the natural rock formations. The locks were two and a half feet deep (76,2 cm) at the gate sills and were designed to provide passage to "batteaux" or other small craft which could carry between 30 and 40 barrels of flour.

The Trou-du-Moulin Canal in 1980.
(PROVIDED BY THE SOCIÉTÉ DE RECHERCHES HISTORIQUES POINTE-DES-CASCADES INC.)

Towing "batteaux" with ropes increased the cost of transporting goods in the late 1800s.
(PUBLIC ARCHIVES OF CANADA)

This first canal system overcame the Cascades and Coteau-du-Lac rapids and that no canal was built at Cedars. This set of canals appeared to have a promising future before it since on August 22, 1783, Twiss proposed raising the toll to 25 shilings by "batteau" once the Split Rock Lock was completed. Working on the assumption that traffic would be as heavy as it had been in 1781, Twiss expected revenues to amount to more than 325 pounds sterling a year. Since we have no statistics we unfortunately cannot verify these estimates for 1783; however, owing to the arrival of thousands of Loyalists between 1783 and 1784, there is every reason to believe that Twiss' expectations were greatly surpassed.

Even though the military installations at the Coteau-du-Lac Canal made it strategically more important, the fact remains that the canals at Faucille, Trou-du-Moulin and Split Rock were also part of the military canal system. Traces of each of these canals, particularly of the one at Trou-du-Moulin, still exist. Indeed, for several years now, the Cascades Point Historical Research Society has made efforts to protect the canal by excavating the channel site and resetting some of the stones that used to form the lateral walls. The Trou-du-Moulin site shows us what the original scale of navigation for one of the military canals really was. On the other hand the Coteau Canal has undergone many changes since 1781 and does not constitute a good witness of the first canals.

It cannot be disputed that the Faucille, Trou-du-Moulin, Split Rock and Coteau-du-Lac canals were an invaluable aid to navigation, for they made it possible to traverse the roughest part of the river. However, there were still many obstructions along the Montreal-Kingston route, especially at the Lachine, Cedars, Long Sault, Farran's Point, Rapide Plat and Galops rapids. Moreover, even with the appearance of the first canals on the St. Lawrence, transportation by "batteau" continued to be a long and very expensive process. It is thought that an average trip between Montreal and Kingston took 12 days and that the cost to transport a barrel over that distance was expensive.

Such a situation could probably have been tolerated for several years had it not been for the massive influx of more than 10 000 Loyalists at the end of the American Revolution.

In the foreground, a Durham boat with load around 1828.
(PUBLIC ARCHIVES OF CANADA)

## CHANGES TO THE FIRST CANAL SYSTEM (1804-1817)

Between 1804 and 1817, the St. Lawrence Canal network underwent a series of modifications brought about in part by the arrival of the Loyalists and in part by the War of 1812.

The large scale requirements for supplies of several thousand new arrivals on the upper St. Lawrence and on the north shore of Lake Ontario were to change the volume and the very nature of traffic on the St. Lawrence canals. Indeed, after the peace treaty between England and the United States was signed in 1783, the provisioning of the military became less important than the commercial transportation of food, spirits, farming equipment, stoves, hardware, clothing, in short all those goods required in order to establish new settlements. As Colonel Mann, who was in charge of inspecting the canals in 1800, points out, the network was no longer equal to the demands made of it, for three reasons. First, the Durham boat had been introduced and were too wide for these locks. Second, the water level was too low. Third, some of the locks were in need of repair.

At the beginning of the nineteenth century, traffic on the St. Lawrence had become so great that a new ship was brought into service. It was the Durham boat, a craft commonly used in the northern United States. While the first canals on the St. Lawrence had been designed to accomodate the "batteau", which was 30 to 40 feet long (9,1 to 12,1 m) by 5 to 8 feet wide (1,5 to 2,4) with a 3 to 5 tons capacity ("batteaux" over 6 feet (1,8 m) wide could not enter the canals), the Durham boat could be as large as 80 to 90 feet (24,3 to 27,4 m) long by 9 to 10 feet (2,7 to 3 m) wide and could thus carry up to ten times as much as the "batteau". The increasingly regular use of the Durham boat on the waters between Montreal and Kingston therefore made sweeping changes to the canal system imperative.

The drop in the water level on the river also posed serious problems. The extremely rapid clearing of land to establish new agricultural settlements in Upper Canada precipitated the progressive disappearance of a number of the small rivers and stream that emptied into the river. As a result, the locks in the St. Lawrence canal network were both too shallow and too narrow to allow the Durham boats to pass.

The final remarks Colonel Mann had to make in his report concerned the physical condition of the locks in the first canal system. He felt that the canals at Faucille and Trou-du-Moulin, for instance, had been so badly damaged by ice that he recommended a new canal be built to replace them. As for the locks at Coteau-du-Lac and Split Rock, Mann discovered that they were so narrow that a flat-bottomed boat had great difficulty gaining access to them. Mann therefore proposed that the dimensions of these locks be substantially altered but, owing to lack of funds, these canals were only partly rebuilt in 1804. That same year, the canals at Faucille and Trou-du-Moulin were replaced by the Cascades Canal, which was 1500 feet (457,2 m) long and comprised three locks that were still no wider at the gates than six feet (1,8 m) from post to post. The fact that the canals at Faucille and Trou-du-Moulin were taken out of service and replaced by the

Cascades Canal was certainly a major change; however, the canal system continued to have a scale of navigation of no more than six feet (1,8 m) in width and a draught of 2.5 feet (76,2 cm) in 1804.

Nevertheless, shortly after the War of 1812, it became apparent that it was important to improve further the lines of communication between Upper and Lower Canada, for it had been very difficult to supply the posts located near the Great Lakes during the second conflict between Canada and the United States. Thus, just as the American Revolution had prompted the establishment of the first canal system on the St. Lawrence, the War of 1812 was responsible for a number of changes which, directly or indirectly, contributed to the creation of a more complete network of canals in Canada.

As early as 1817, the military canals at Cascades, Split Rock and Coteau-du-Lac were doubled in width and were deepened to 3.5 feet (1 m). This new scale of 12 feet (3,6 m) in width and 3.5 feet (1 m) in depth then ensured that the Durham

Model of the Durham boat, used in the early nineteenth century on the St. Lawrence.
(PUBLIC ARCHIVES OF CANADA)

boats and large flat-bottomed boats had access to the entire network of canals on the St. Lawrence. At around the same time, between 1813 and 1815 to be more precise, the area around the Coteau-du-Lac Canal was extensively built up for defence purposes since the Coteau site had one of the most strategic locations on the St. Lawrence.

At Lachine, the Government of Lower Canada, with financial assistance of some 10 000 pounds sterling from the Imperial Government, completed its first canal between 1821 and 1824. Built to surmount the first obstacle to navigation west of Montreal, the Lachine Canal was 12,8 km in length and contained seven locks that were 100 feet long (30,4 m), 20 feet (6 m) wide and 5 feet (1,5 m) deep. Though it is undisputed that commercial pressures were responsible for the completion of the canal, it is also true that the Imperial Government made a substantial contribution toward meeting military requirements. The Imperial Government killed two birds with one stone in providing the funds; it obtained

Cedars Rapids at the beginning of the nineteenth century.
(PUBLIC ARCHIVES OF CANADA)

free transportation on the canal for its troops and military equipment and did not have to foot the entire bill.

It had in fact been made apparent to the British administrators for the second time that the St. Lawrence was extremely vulnerable in terms of defence; hence it became imperative to construct a network of canals at a distance from the American border to provide supplies to the Great Lakes. It was thought, then, that Montreal and Kingston should be connected by a series of new canals situated on the Ottawa and Rideau rivers; this was why London agreed to underwrite a portion of the construction costs for the Lachine Canal, an essential link to the new canal system.

The attention of the Imperial Government was monopolized by the building of the Ottawa and Rideau Canals, an undertaking which spanned the years 1816 to 1834. The explanation for the Imperial Government's lack of interest in improving the St. Lawrence canal system was its fear of, not to say obsession with, a third American invasion by way of the St. Lawrence. Nevertheless, some people were concerned by this disinterest: members of the Legislative Assembly of Upper Canada and Randolph Isahm Routh, Commissioner General of the British Army in Canada. In February 1833, Routh sharply criticized the many flaws in the St. Lawrence canal system. Even though there were military canals between lakes St. Louis and St. Francis, Routh stressed that obstacles were still present along the entire length of the section and that the dimensions of the locks restricted passage to "batteaux" 3,6 m wide. Far from having easier going as progress was made upstream, "batteaux" encountered many additional obstacles near Cedars, where half their cargoes had to be unloaded and carted for 9,6 km; the boats then had to be towed past the rapids with horses or oxen. It is thought that many of the farmes living near the rapids were able to earn more than $4 a day for hauling the boats. Since the military locks had been hastily constructed they were in very poor condition in the 1830s; however, Routh contended that they were valuable enough to warrant a minimum in repairs.

Between 1818 and 1825, shipments of goods up the St. Lawrence amounted to some 5000 tons per year and increased to 21 000 tons in 1832. More than 863 "batteaux" and 612 Durham boats were employed in these activities in 1833, which generated revenues of some 2218 pounds sterling in return for using the military canals at Cascades, Split Rock and Coteau-du-Lac. Much more substantial during the same period was the shipment of goods downstream, from the Great Lakes towards Lachine; a total of 15 000 tons per year were freighted between 1818 and 1825, three times the commercial traffic in the opposite direction. This traffic was so heavy that a customs office was set up at Coteau-du-Lac in 1797 to ensure a more equitable distribution of revenues between the provinces of Upper and Lower Canada. In 1832, downstream commercial freight had reached 66 000 tons per years and mobilized more than 800 Durham boats and from 1200 to 1500 "batteaux". At that time, barrels of flour, peas, salt, potash, rum and bales of furs constituted a large proportion of the commercial goods transported on the canals of the St. Lawrence. Timber was lashed into immense log booms and sailed directly over the rapids abuting the canals.

Log boom descending the St. Lawrence River around 1830.
(PUBLIC ARCHIVES OF CANADA)

Reassembling of a boom at the foot of the Cascades Rapids during the second half of the nineteenth century.
(PUBLIC ARCHIVES OF CANADA)

These statistics indicate a marked upsurge in traffic on the St. Lawrence canals from the time they were opened, for only 263 "batteaux", 2 canoes and one light craft had been recorded in 1781. Accordingly, with firm faith in the strictly commercial use of the St. Lawrence Canals in the 1830s, John Macaulay, one of the members of the Upper Canada Commission for the improvement of navigation on the St. Lawrence, proposed that ownership of the military canals at Cascades, Split Rock and Coteau-du-Lac be transferred from the Imperial Government to the provinces. The transfer did not take place until 1841, however, and it was not until that decade that the St. Lawrence navigation system was overhauled along its entire length, following the union of Upper and Lower Canada.

## THE CORNWALL CANAL

In 1830, however, the municipality of Brockville approached the Legislative Assembly of Upper Canada to request that it consider building a canal up by the rapids at Long Sault (the Cornwall Canal). The municipality was understandably afraid that, once the Ottawa-Rideau canal network was completed, it would siphon off all the commercial traffic on the St. Lawrence, which would clearly cut into its own commercial activities. In response to pressure from the municipality of Brockville, the province of Upper Canada undertook alone the construction of the Cornwall Canal. Work commenced in 1834 but were delayed owing to financing problems brought on by the political troubles of 1837-1838. Later on we shall see that the scale of navigation adopted for the Cornwall Canal makes it far more typical of the second, rather than the first canal system.

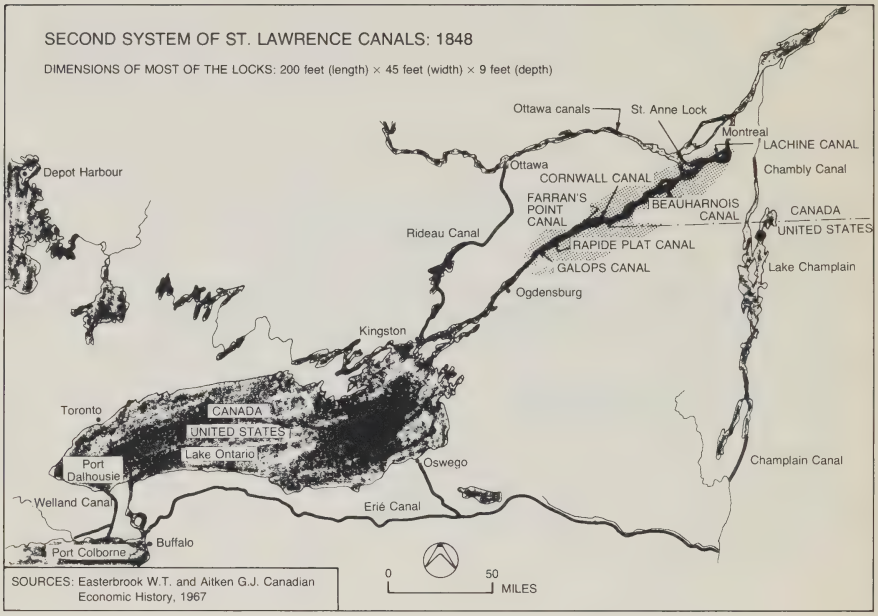
Thus, on the eve of Union, the St. Lawrence canal system was still incomplete and a number of its components were not uniform. The Cornwall Canal was under construction, the Lachine Canal had a scale of navigation that was different from the military canals, and many sets of rapids located above Cornwall were still untamed.

The first system of canals on the St. Lawrence met both military and commercial needs; however, there was no co-ordination among the different levels of government involved in its construction.

Dissatisfied with the improvements the Imperial Government had undertaken in 1817, the Legislative Assembly of Upper Canada asked Lower Canada to help it upgrade navigation on the St. Lawrence as early as 1818. That same year, a joint commission was formed to look into the matter, and it recommended improvements between Montreal and Lachine, between the head of Lake St. Louis and Lake St. Francis, and at all of the rapids located upstream of Lake St. Francis in the territory of Upper Canada. Apart from building the Lachine Canal, the Legislative Assembly of Lower Canada did not pursue the recommendations of the joint commission.

On the one hand, the interest shown by Upper Canada in having the canal system revamped is quite understandable. Indeed, for this province, the development of a complete network of canals on the St. Lawrence was the only solution to the problem of securing access to outside markets. However, the position of Lower Canada was completely different. Throughout the entire period that preceded Union, the Legislative Assembly of Lower Canada systematically blocked all such public works programs as the ones to deepen the river and to develop ports and canals. At that time, the lumber, grain and ship-building businesses were in British hands, and French Canadians were adamantly opposed to that state of affairs. Lower Canada, whose population was very predominantly French Canadian, quite simply did not wish to pay taxes for something that would serve outside interests first. Hence funds to develop canals on the St. Lawrence would be obtained until political union was to take place between the two provinces.

# OPENING OF THE SECOND CANAL SYSTEM 1848


SECOND SYSTEM OF ST. LAWRENCE CANALS: 1848
DIMENSIONS OF MOST OF THE LOCKS: 200 feet (length) × 45 feet (width) × 9 feet (depth)
Ottawa canals
St. Anne Lock
Montreal
LACHINE CANAL
Chambly Canal
Depot Harbour
Ottawa
CORNWALL CANAL
FARRAN'S POINT CANAL
BEAUHARNOIS CANAL
CANADA
UNITED STATES
Rideau Canal
RAPIDE PLAT CANAL
GALOPS CANAL
Lake Champlain
Ogdensburg
Kingston
Toronto
CANADA
UNITED STATES
Lake Ontario
Port Dalhousie
Oswego
Champlain Canal
Welland Canal
Erié Canal
Buffalo
Port Colborne
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SOURCES: Easterbrook W.T. and Aitken G.J. Canadian Economic History, 1967

## PREVAILING CIRCUMSTANCES

Preoccupied with strategic concerns the Imperial Government, even though it had promoted the St. Lawrence canal system, preferred to concentrate on developing the Ottawa-Rideau Waterway since it believed it would be a more secure route in the event of conflict on the St. Lawrence. In addition, the provinces of Upper and Lower Canada were at absolute loggerheads over public works in general, and the St. Lawrence canals in particular.

In 1825, the Americans, who had just finished building the Erie Canal, thus created another threat to the commercial future of the St. Lawrence. The seriousness of this threat can be grasped by taking a look at some of the export statistics for the major goods produced by the West in the early 1830s. While 91 862 barrels of flour and 293 968 bushels of wheat were shipped through the St. Lawrence canals in 1832, in 1834 more than 97 027 barrels of flour and 748 433 bushels of wheat were exported to New York through the Erie Canal, and 1834 was considered an unproductive year.

Even though the American canal system provided stiff competition for the St. Lawrence system, the Canadian network experienced a new spurt of commercial growth at the close of the 1830s. Upper Canada was thus doubly justified in calling for the implementation of all the recommendations made by the joint commission in 1818, recommendations which supported a complete overhaul of the St. Lawrence canal system. Unfortunately, the two provinces were heavily in debt in 1841, and this was extremely detrimental to Canadian credit on the London market. The political union of the provinces of Upper and Lower Canada in 1841 finally succeeded in pulling them out of this financial impasse because it strengthened the guarantee that the unified provinces could provide to obtain additional loans in London. Thus, a loan of 1.5 million pounds sterling was granted to the new Government to reduce its public debt and to float a public works program. The entire loan was earmarked for the digging and repairing of canals, and for building new roads. Beginning in 1841, the Board of Work, a body created by the Government of the Union, became actively involved in planning the second system of canals on the St. Lawrence.

The Sloop appeared on the St. Lawrence after 1848. (PUBLIC ARCHIVES OF CANADA)

Several schooners at the west entrance of the Welland Canal in 1885. (PUBLIC ARCHIVES OF CANADA)

Steamboats in the Cornwall Canal around 1882. (PUBLIC ARCHIVES OF CANADA)

## DESCRIPTION OF THE SECOND CANAL SYSTEM

It would be fair to describe the 1840s as the canal decade, since it was during this period that three different networks of canals — one on the St. Lawrence River, one on the Richelieu River and one on the Ottawa-Rideau rivers — were operative at the same time.

In the case of the St. Lawrence, the challenge was considerable for the primary goal was to take over exporting the bulk of grain shipments from the Canadian West and the American Midwest. A canal-building program of a scope hitherto unknown was therefore initiated, with the aim of linking Lake Huron and Quebec City. The Lachine Canal was made larger, the old military canals at Cascades, Split Rock and Coteau-du-Lac were replaced by the Beauharnois Canal, the construction of the Cornwall Canal begun before Union was completed and finally, all the rapids upstream of Long Sault were overcome with the construction of three new canals known as the Williamsburg Canals. The second system of canals was designed to open passage to the vessels that plied the Great Lakes: sloops, schooners and of course, steamships, which were rapidly coming into common use.

At Lachine, Board of Work engineers decided to adapt the old 1825 canal to a new scale of navigation standardized for all the St. Lawrence canals. The enlargement was carried out from 1843 to 1848. When the new canal was opened, its length remained unchanged but it had five instead of seven locks. The locks were 200 feet (60,9 m) long by 45 feet (13,7 m) wide and had 9 feet (2,7 m) of water on the sills. As a result of pressures brought to bear by the Chamber of Commerce and the Montreal Merchant Class, the sills of locks No 1 and No 2 were lowered to 16 feet (4,8 m) instead of 9 feet (2,7 m), so that the largest oceangoing vessels visiting Montreal at that time might enter the first basin of Lachine Canal.

Much more substantial changes were brought about between Lake St. Louis and Lake St. Francis. The military canals at Cascades, Split Rock and Coteau-du-Lac were replaced in their entirety by the Beauharnois Canal, which was under construction from 1842 to 1845. Eleven and a quarter miles long (18,1 km), the Beauharnois Canal contained 9 locks, each 200 feet (60,9 m) long by 45 feet (13,7 m) wide with 9 feet (2,7 m) of water on their sills. It was the first of the St. Lawrence canals ever to be built on the south shore. According to J.-P. Lantier, Member of Parliament for Soulanges in the 1870s, the construction of the canal on the south shore was the greatest government blunder committed following the Act of Union for it had been shown, even as the canal was being built, that the north shore was the superior location. Lantier also contended that the south shore location had been selected as a result of a sheme plotted in London by the new owners of the Beauharnois Seigniory, the Irish Colonisation Society, in concert with the former owners and the Governor General himself. These supporters of the south shore site succeeded in diverting $255 900, which had been earmarked for building the canal on the north shore, into the Beauharnois Canal. An investigation into the matter in 1842 exposed the subterfuge, but it was already too late. Work had begun on the Beauharnois

Construction of the enormous levee forming the south side of the Cornwall Canal around 1840. (PUBLIC ARCHIVES OF CANADA)

Canal and, with the end of its session, the Legislative Assembly was unable to act in time. The contracts were awarded, the work went on, and in 1845 the Beauharnois Canal was open for business.

It should be recalled that the Legislative Assembly of the Upper Canada had undertaken the building of a canal at Cornwall as early as 1834, but the work had been interrupted by the Rebellion of 1837-1838. It was therefore under the unified Canadas that the canal was completed in 1843. The canal was 18,5 km long and contained seven locks measuring 200 feet (60,9 m) in length, 55 feet (16,7 m) in width, with 9 feet (2,7 m) of water on the sills. Of all the canals that formed the second system of canals on the St. Lawrence, no other required as much attention and surveillance as did the Cornwall Canal, beginning shortly after it opened. As it happened, the canal hugged the north shore of the river along its course, which necessitated the building of a very solid levee between it and the river. The levee was plagued with severe leaks and, in the even of a war with the United States, this structural weakness of the canal would have made it the most vulnerable point on the entire St. Lawrence.

The St. Lawrence network of canals was fully completed with the construction of the canals at Farran's Point (1847), Rapide Plat (1847), and Galops (1846). Collectively called the Williamsburg Canals, they were used only by loaded boats ascending the St. Lawrence, for the ships could traverse these small rapids with ease when they were bound downstream. The Williamsburg Canals included a group of six locks built to the uniform navigation scale of 200 feet (60,9 m) in length by 45 feet (13,7 m) in width, with 9-foot (2,7 m) water depth on the gate sills.

Buffalo in 1915, one of the Erie Canal terminals on the Great Lakes.
(PUBLIC ARCHIVES OF CANADA)

## COMMERCIAL SETBACK

In spite of all the money and effort invested to develop the St. Lawrence canal network, the project's supporters failed in their bid to take over the bulk of grain exports from the West. Barely three years after the second canal system opened, the Commissioner of Public Works acknowledged that this commercial waterway had failed to meet expectations, saying that export statistics had only doubled while it had been hoped that they would increase seven fold on the Upper St. Lawrence section. There are three main reasons for this shortfall: the British had abandoned protectionism, the Erie Canal was a strong competitor for business, and a new competitor had appeared on the scene — the Railroad.

The economic context had in fact changed a great deal between the time plans were drawn up for a canal system on the St. Lawrence and the time the waterway was opened. While the Canadas had believed they could count on a long term of preferential treatment by England with respect to Canadian exports on the British market, England rescinded its policies for preferential tariffs on Canadian lumber and wheat one after the other, in 1842 and 1846. Since transportation costs were higher between Montreal and Liverpool than between New York and Liverpool, from that point on the St. Lawrence lost its edge over the Erie Canal for exporting products from the West. Thus, beginning with the first decade the second canal system on the St. Lawrence was in operation, an increasingly larger volume of goods was routed to the Erie Canal. In 1858, this trend attained truly tragic proportions for the commercial future of the St. Lawrence canals; for every six and a half tons of cargo shipped to New York via the Erie Canal, the St. Lawrence received only a half-ton or so. Moreover, the volume of flour and grain funnelled off by the Erie Canal between 1855 and 1860 was just as substantial. While the two Erie Canal terminals on the Great Lakes, Buffalo and Oswego, recorded an annual average of 1 313 277 barrels of flour and 27 527 088 bushels of grain for the period, the arrivals of flour and grain at Canadian seaports from the West amounted to only 205 821 barrels and 672 625 bushels.

In view of this imbalance, it is difficult to speak of competition between the St. Lawrence network of canals and the Erie Canal, since the latter monopolized the lion's share of grain exports from the West. The already well-established domination of trade by the Erie Canal was not the only cloud on the horizon, a brand-new competitor for the St. Lawrence canals loomed: the American railroads.

Great Trunk Line next to Montreal Harbour around 1870.
(NOTMAN PHOTOGRAPHIC ARCHIVES, MCCORD MUSEUM)

They smoothed out the problems that transporting goods by the Erie Canal entailed, while reducing the distances between the West and the port of New York. Beginning in 1853, a railway network of sixteen lines was amalgamated to form the New York Central, which already linked Lake Erie with New York. In addition, in 1850 a second American railway line linked up Ogdensburg, N.Y., on the south shore of the St. Lawrence, with Boston. Montreal businessmen thus felt threatened on two fronts, for the New York Central siphoned off exports from Lake Erie to New York and the Ogdensburg-Boston railroad cut into the exports from Lake Ontario bound for Montreal.

Canadians too began to develop a railway network in the 1850s; however, the network rapidly entered into competition with the St. Lawrence canals when it was only supposed to relieve them during the winter shutdown for navigation on the St. Lawrence. With all the competition ranged against them, the St. Lawrence canals had not the faintest chance of achieving their goal; none the less, they did manage to achieve some standing in transportation of Canadian cereals for international markets. They also had a secondary use which should be discussed.

View of the Redpath refinery, located near the Lachine Canal, in 1953.
(PUBLIC ARCHIVES OF CANADA)


Ogilvie mill located near the Lachine Canal, in 1903.
(PARKS CANADA)

## SECONDARY ROLES PLAYED BY THE CANALS

It was not until 1847 that it was decided the surplus water in the Canadian canals should be leased to individuals or to manufacturing establishments as a source of water power. On the St. Lawrence, a total of 99 leases and sub-leases of lots was distributed along the banks of the Lachine, Beauharnois, Cornwall and Williamsburg canals. These leases ran from one to twenty-one years, but most were for a term of twenty-one years. Water surpluses were put to a wide variety of uses. For instance, they were used to operate grist mills, sawmills, paper mills, furniture factories, tanneries and all types of manufactories and workshops. Depending on the volume of water used, the annual rents could vary from $10 to $1680. Located at the transition point between ocean and inland navigation, the Lachine Canal had one of the densest industrial concentration in Canada during the 19th century and accounted for 46 of the 99 leases granted between 1847 and 1862. The lots leased were on both sides of the St. Gabriel Lock (lock No 3), Côte-St. Paul Lock (lock No 4), Basin No 1 and Basin No 2 on the south side of the canal.

Ira Gould was the first lessee of lots adjacent to the Lachine Canal in 1847. In 1856 his business holdings, grouped at Basin No 2, comprised two flour mills, three nail and barbed wire factories, two foundaries, a scythe factory and two sawmills.

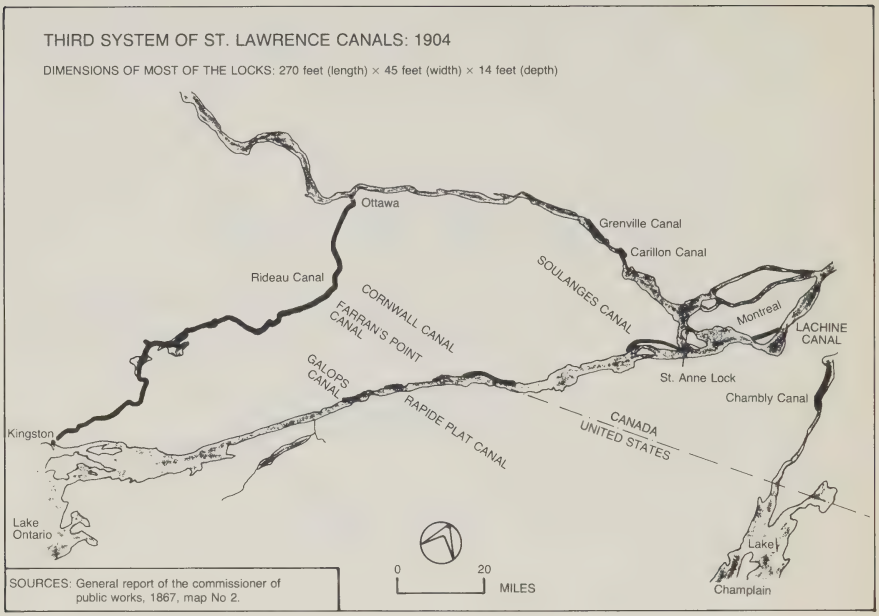
The two sides of the St. Gabriel Lock were also quite heavily industrialized between 1851 and 1853; upwards of a thousand people found work in the shipyard, the three foundries, the rubber works, the sugar refinery, the cotton factory, the cordage factory, the sash-and-door factory, the sawmill, the cooperage, the wool mill, the machine shops and the grist mill.

There were also many manufacturing establishments around the Côte-St. Paul Lock and Basin No 1. In all, it is estimated that the Lachine Canal provided a supply of water power equivalent to 4 million horsepower in the 1860s. While the leasing of surplus water from the Lachine Canal made manufacturers very happy because they were also installed besides navigable waters, the navigators themselves saw in it a major disadvantage. The withdrawal of large volumes of water by turbines created a strong current within the canal, which was a serious impediment to navigation. It was suggested that the problem could be overcome if water power could be drawn from a source other than the canal to run the various industrial facilities. The suggestion was rejected, for the leasing of surplus water, on both the Lachine Canal and the other St. Lawrence canals, was still common practice in the first decades of the twentieth century.

Even though the St. Lawrence canals failed to meet the primary purpose assigned to them when they were opened, it cannot be denied that they contributed to the industrial development of Montreal. Such prestigious names as Redpath and Ogilvie, bear ample witness to the influence of the Lachine Canal on the industrial development of Montreal.

We should not neglect to point out that surplus water was also leased on other canal systems, more specifically at the Welland, Rideau and Chambly canals and at the St. Ours Lock. The second system of canals on the St. Lawrence had thus failed it in its attempt to take over exporting most of the West's grain production. Nevertheless, it did accomplish an acceptable measure of success, in view of the unfavorable circumstances under which it was forced to operate.

# CHANGES IN THE CANALS ON THE ST. LAWRENCE 1871-1959


THIRD SYSTEM OF ST. LAWRENCE CANALS: 1904
DIMENSIONS OF MOST OF THE LOCKS: 270 feet (length) × 45 feet (width) × 14 feet (depth)
Ottawa
Grenville Canal
Carillon Canal
Rideau Canal
SOULANGES CANAL
CORNWALL CANAL
FARRAN'S POINT CANAL
Montreal
LACHINE CANAL
GALOPS CANAL
St. Anne Lock
Chambly Canal
RAPIDE PLAT CANAL
CANADA
UNITED STATES
Kingston
Lake Ontario
Lake Champlain
0
20
MILES
SOURCES: General report of the commissioner of public works, 1867, map No 2.

## FOURTEEN-FOOT-DEEP (4,2 m) CANALS

***A new purpose***

Water transportation was stimulated anew shortly after Confederation for a commission on canals was appointed in 1870 to enquire as to the best means of comprehensively improving the canal system in Canada. As a consequence, the St. Lawrence canals were assigned a new purpose, one that was both political and economic. They were to assist in stimulating the commercial development of the Dominion as a whole through providing access to the sea, by way of Canadian waters, for goods from the Western regions. In order to achieve this, the Canals Commission recommended to Parliament that all the locks between Lake Superior and Montreal be enlarged to uniform dimensions of 270 feet (82,2 m) in length by 45 feet (13,7 m) in width with a 12-foot (3,6 m) depth of water on the gate sills. Since businessmen thought that this depth was not great enough, they recommended that it be increased to 14 feet (4,2 m) at the gate sills, but their proposal was not accepted by the Canadian Government until 1875. In the meantime, in 1873 the Department of Public Works had already authorized the enlargement of the Lachine, Welland and Cornwall canals according to the scale proposed by the Commission. As a result, these canals had to be altered to conform to the new standard in 1875, which required that 14 feet (4,2 m) be the depth for all the locks located on the St. Lawrence and Great Lakes circuit.

But enlarging the St. Lawrence canals was just one of many priorities outlined by the Canals Commission. A much broader program of improvements which included enlarging the Welland Canal, upgrading the Ottawa and Richelieu canals, dredging the St. Lawrence River and building additional canals in the Maritimes and around the Great Lakes was put forward.

The scope of these undertakings is one of the reasons deepening the St. Lawrence canals to 14 feet (4,2 m) was not completed until 1904. There was another, equally important factor contributing to the delay in the construction of the third system canals on the St. Lawrence. The importance of commercial navigation was such that it was essential it never be interrupted by construction work. It is easy to imagine the technical problems such a restriction could pose.

***Construction of the third canal system***

At Lachine, five new locks were built alongside the five locks that were already in place. They were to continue to operate for the entire period of construction, from 1875 to 1884. The older locks were in their turn rebuilt so as to duplicate the newer ones. The canal was adapted so as to permit the passage of boats requiring a draught of 14 feet (4,2 m), and possessed two entrances at either end. At Montreal, the first two locks in the new system were distinguished by a water depth of 18 feet (5,4 m) at their gate sills, while the rest were in line with the specifications proposed by the Commission and thus had a depth of 14 feet (4,2 m). All the locks in the new system were 270 feet (82,2 m) long and 45 feet (13,7 m) wide.

Hydro-electric power house at the Soulanges Canal in 1910.

Coteau Landing grain elevators at the head of the Soulanges Canal.

Just as had occured between 1833 and 1842, the question was raised again in 1890 as to whether a new canal should be built on the north shore or the south shore of the St. Lawrence River, or again, whether it would not be preferable to enlarge the canal already in existence on the south shore. It was not until February 7, 1891 that the Canadian Government finally decided to construct a brand-new canal, this time on the north shore of the river. The work that was carried out from 1892 to 1899 produced the Soulanges Canal, which was 23,4 km in length and made up of five locks and not nine, as was true for the Beauharnois Canal. It is interesting to note that lock No 2 of the Soulanges Canal traversed the course of the Cascades Canal, built in 1804 by the military engineers.

The Soulanges Canal locks were slightly longer than had been recommended by the Commission, for they were 280 feet (85,3 m) long by 45 feet (13,7 m) wide and 14 feet (4,2 m) deep. However, the Soulanges Canal was much more interesting with respect to the materials used and construction technique. Gradually, more and more concrete was used instead of more traditional materials such as stone and wood. Moreover, an hydro-electric power plant was added to the canal facilities. The plant was to be a source of cheap energy, and would be used in all the canal's operations, in lighting it, and in providing horsepower for a cable to tow the largest, 2000 ton ships.

The electrification of the canal was an unqualified success, for it opened it up to night traffic and thus almost doubled its capacity. The Soulanges Canal had a special purpose: the transportation of cereals. But barely one year before this canal was opened, a new system for transporting grain from the West came into operation, which permitted the transhipment of large Great Lakes cargos in Canada Atlantic cars at its Depot Harbour terminal on Lake Huron. From there, the railroad carried the grain to the elevators at Coteau Landing, which were located at the head of the Soulanges Canal. The grain was then transhipped again in barges bound for Montreal. The Soulanges Canal thus became an essential link in this new transportation system for grain.

At Cornwall, work to adapt navigation to a scale of 14 feet (4,2 m) in depth continued from 1876 to 1904. As in the case of the Lachine Canal, the channel was deepened, widened, and the old locks were kept in service while the six new ones, which were 270 feet (82,2 m) long, 45 feet (13,7 m) wide and 14 feet (4,2 m) deep, were being built. The installation of winches in 1905 was the finishing touch on improvements to the canal.

The third system of canals on the St. Lawrence was at last complete with the enlargement of the Williamsburg Canals at the beginning of the 20$^{th}$ century. The Farran's Point Canal was completed in 1899, the Galops Canal in 1904 and the Rapide Plat Canal in 1905. This last section on the upper St. Lawrence was unusual because two of the Farran's Point locks were assembled so that they formed a single large lock that was 800 feet (243,8 m) long and 50 feet (15,2 m) wide. A similar lock was built at the Galops Canal. These locks were to accelerate the passage of boats, for they were able to handle much longer convoys in a single locking operation.

Welland and Sault-Sainte-Marie Canals extended the network of St. Lawrence Canals and provided a link between the head of Lake Superior and Montreal. In all, forty-eight locks were developed to surmount a change in level of 168,6 m between the two points. The stretch of canals on the Upper St. Lawrence from Montreal

This Great Lakes boat appeared at the same time as 14 foot canals on the St. Lawrence, and disappeared when they did.
(PUBLIC ARCHIVES OF CANADA)


Ship bearing pulpwood, bound for the Great Lakes in 1934.
(PARKS CANADA)

to Kingston alone possessed 22 of these locks and recorded a change in level of 68,2 m.

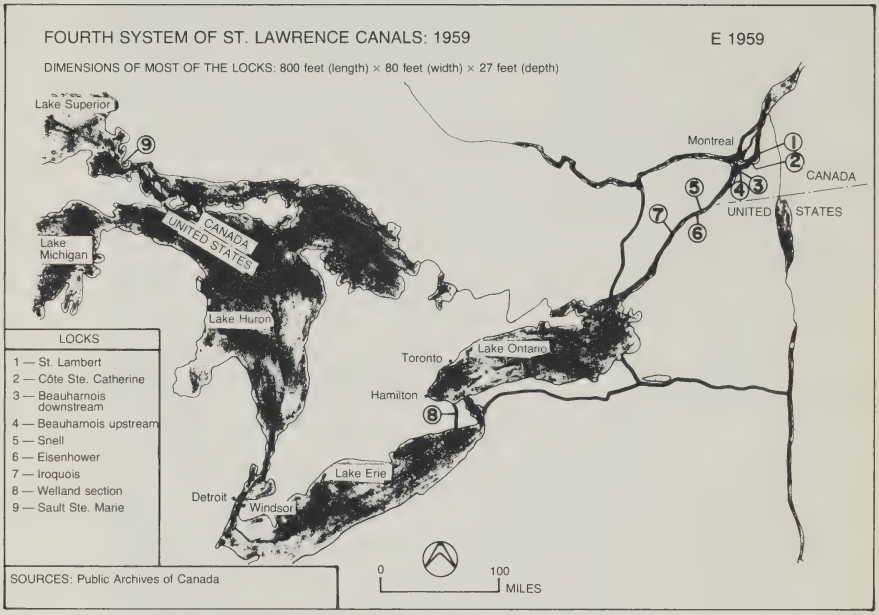
***Commercial use***

Two types of boats were specially constructed for travel on the St. Lawrence canals: oceangoing ships and Great Lakes freighters. Manufactured in Sweeden and Holland, the oceangoing ships first appeared around 1935 and provided a direct link between the ports of Europe and those of the Great Lakes. Even though it is estimated that there were more than 120 of these ships around 1959, they transported only a small percentage of the total tonnage recorded for the St. Lawrence canals. However, if there is a single vessel that the third system of canals on the St. Lawrence immediately brings to mind, it is the typical Great Lakes freighter. With a maximum length of 77,7 m, these ships had a cargo capacity of up to 2000 tons of iron ore or 106 000 bushels of grain. More than 200 boats of this type were built.

A great many products were transported on the St. Lawrence canals during the 54 years it was in use and, even though there were some fluctuations, official statistics show several constants for the entire five-decade period. With respect to the volume and the direction of traffic for instance, more tons of coal and grain than any other commodity were shipped downstream from the time the 14-foot-deep (4,2 m) canals opened until they ceased operations. Upbound traffic mainly involved cargos of pulpwood and petroleum products. All things considered, in contrast with the second system of canals on the St. Lawrence, the third system did fulfill the purpose it was assigned. However, the annual tonnage recorded on the third system was still only half of the tonnage recorded for traffic on the Welland Canal alone in 1946 and 1947. In fact, beginning in 1932, the 270-foot-long (82,2 m), 14-foot-deep (4,2 m) locks of the St. Lawrence canals were a real bottleneck for traffic coming from the Great Lakes, since the Welland Canal had been enlarged to 829 feet (252,6 m) in length by 80 feet (24,3 m) in width and was 30 feet (9,1 m) deep at that time.

In view of the commercial success of the Welland Canal and the upsurge in grain exports to Europe with the outbreak of the First World War, the Canadian and American Governments undertook lengthy discussions on the possibility of enlarging the St. Lawrence Canals anew. In 1959, the studies that had been conducted culminated in the opening of the present-day Seaway and the abandonment of the 14-foot-deep (4,2 m) canals.

Oceangoing vessel in the Iroquois Lock in 1959. This type of ship first appeared in the St. Lawrence canals around 1935.
(PUBLIC ARCHIVES OF CANADA)


FOURTH SYSTEM OF ST. LAWRENCE CANALS: 1959
E 1959
DIMENSIONS OF MOST OF THE LOCKS: 800 feet (length) × 80 feet (width) × 27 feet (depth)
Lake Superior
Lake Michigan
CANADA
UNITED STATES
Lake Huron
Lake Erie
Lake Ontario
Toronto
Hamilton
Detroit
Windsor
Montreal
CANADA
UNITED STATES
LOCKS
1 — St. Lambert
2 — Côte Ste. Catherine
3 — Beauharnois downstream
4 — Beauharnois upstream
5 — Snell
6 — Eisenhower
7 — Iroquois
8 — Welland section
9 — Sault Ste. Marie
SOURCES: Public Archives of Canada
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100
MILES

## THE ST. LAWRENCE SEAWAY

***Location of locks***

Officially opened on June 26, 1959, the St. Lawrence Seaway is the fourth and last canal system to appear on the St. Lawrence since 1779. If we disregard the hydro-electric facilities that were put in place while the Seaway was being built, its constituent parts can be described as follows. In the Lachine Rapids section there are two new locks, one at St. Lambert and the other at Côte-St. Catherine, linking Montreal to Lake St. Louis. Still on the south shore, a 27 foot deep (8,2 m) channel brings us to Beauharnois, where a new canal comprising two locks make it possible to cross the corridor of Lake St. Louis and Lake St. Francis. It is interesting to note that for this section of the St. Lawrence there was alternation between the north and the south shores for the location of each new system of canals since 1779. A bit further upriver, in the international rapids sector, the Snell and Eisenhower locks are also located on the south shore of the St. Lawrence River; however, these locks are controlled by the St. Lawrence Seaway Development Corporation, an American counterpart of our crown corporation, The St. Lawrence Seaway Authority. The course of the Seaway then follows the north bank of the St. Lawrence, where a seventh lock was built at Iroquois in Ontario. This seventh lock is the only one in the entire St. Lawrence canal system that is located on the north shore. Last, the eight remaining locks of the Seaway are to be found at the juncture of lakes Ontario and Erie, in the Welland Canal. There is one important detail that should be mentioned with respect to the geographical boundaries of the Seaway. Even though the administrative responsibility of the two corporations involved in creating the Seaway does not extend beyond Lake Erie, the Sault St. Marie locks (one Canadian lock and four American locks) provide an essential extension to the Seaway for they enable oceangoing vessels to travel as far as Lake Superior. Moreover, all these locks together now make it possible to overcome the change in level of more than 183 m that occurs between Montreal and Lake Superior.

In comparison with the old St. Lawrence canal system, the Seaway possesses several truly outstanding features. While the 14 foot canals (4,2 m) restricted access to vessels that were no more than 77,7 m long with a load capacity of 2800 tons, the Seaway locks, built to the scale of the Welland Canal, now provide access to ships that are 730 feet (222,5 m) long by 75.5 feet (23 m) wide with a draught of 25 feet 9 inches (7,8 m). These dimensions permit a load capacity of some 27 000 to 28 000 tons for Great Lakes freighters while oceangoing vessels are able to transport 9000 to 10 000 tons of goods.

Great Lakes boats nowadays in use on the Seaway.
(PROVIDED BY THE SEAWAY AUTHORITY)

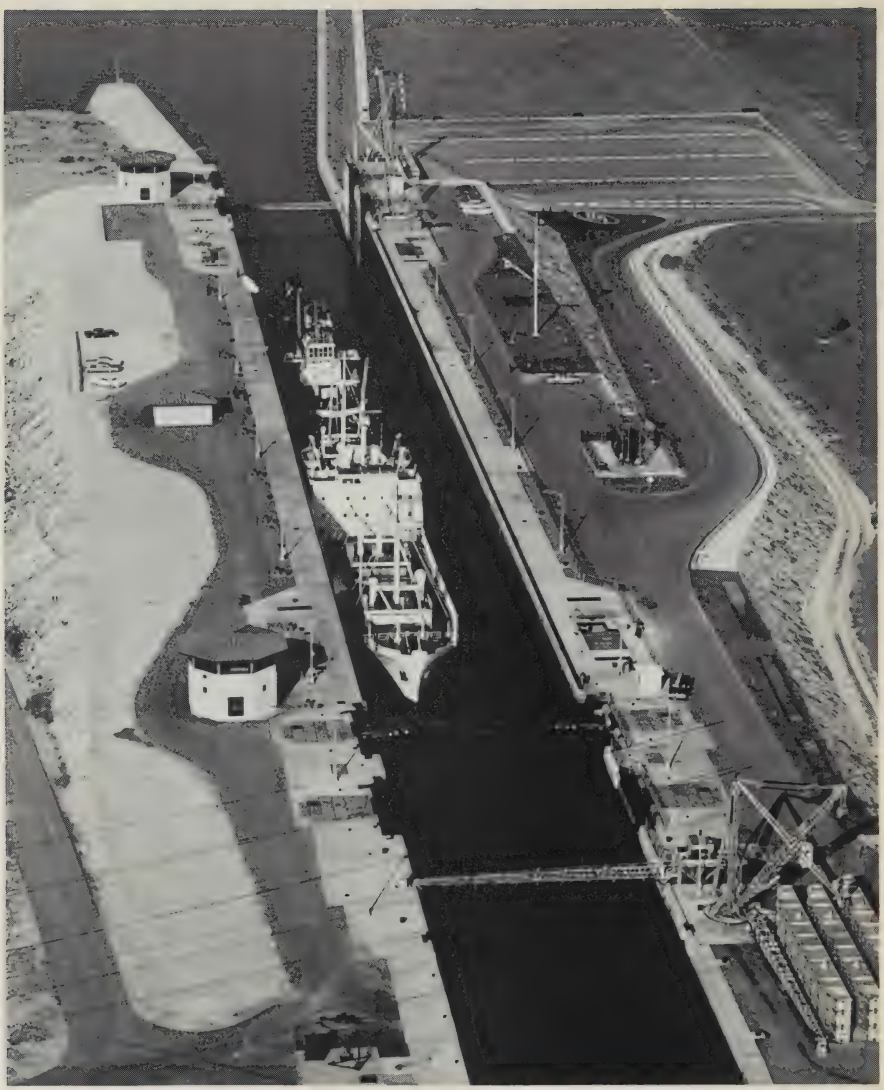
The two types of ship nowadays in use on the Seaway. In the foreground, a Great Lakes freighter and in the background, an oceangoing vessel.
(PROVIDED BY THE SEAWAY AUTHORITY)

***Planning and construction of the seaway***

Even though construction activity for the Seaway took place over a relatively short time, lasting from 1954 to 1959, the fact remains that this impressive achievement was the end result of discussions and studies that were drawn out over fifty years or so.

It all began in 1895, when the Canadian and American Governments set up an International Commission, a body directed to study the plan to build a deep-water channel between the Great Lakes and the sea. As early as 1897, the Commission recommended that the St. Lawrence navigation route be improved; however, this project got no further than the drawing board stage. Studies continued and in 1909, Canada and the United States signed a treaty to create the International Joint Commission. This time the process that was to lead to the construction of the Seaway was undertaken in earnest and the mandate of the new Commission was more clearly defined. Navigation on the St. Lawrence was not the only issue, there were also all the concerns related to border waters and the study of hydro-electric projects to be taken into consideration. The outbreak of the First World War interrupted discussions but, when peace returned, the Commission recommended in 1921 that a new treaty be signed to provide for joint works to deepen the St. Lawrence navigation route between Montreal and Lake Ontario. This recommendation met with the same fate as the one made in 1897; nevertheless, negotiations continued.

Around 1945, the advantages of building dams in the international rapids section became increasingly apparent. Studies showed that such dams would be a major source of electrical power (more than 2.2 million HP) and would greatly facilitate navigation by raising the water level in certain turbulent areas of the St. Lawrence River. It followed that construction costs for the waterway would be appreciably lower since fewer locks would be required and excavation would not have to be as deep. Once this was acknowledged, the pace of events was considerably stepped up. In 1951, the Canadian Parliament passed a Bill in order to create a crown corporation which would be responsible for the development and operations of the Canadian canals in the Seaway. This corporation still exists and is called The St. Lawrence Seaway Authority. The hydro-electric power undertakings were made the responsibility of the Ontario provincial government and New York State, which carried out these activities through the Hydro-Electric Power Commission of Ontario and the Power Authority of the State of New York. Then, after many years of opposition to the project, the American Congress created the St. Lawrence Seaway Development Corporation in 1954 to take charge of the two American locks in the international rapids section of the St. Lawrence River. Work began near Cornwall on August 10, 1954 and continued until the winter of 1958. Finally, on June 26, 1959, Queen Elizabeth II and President Eisenhower officially opened the St. Lawrence Seaway aboard the royal yacht Britannia.



View of an oceangoing vessel in Lock No 3 at Beauharnois around the 1960s.
(PROVIDED BY THE SEAWAY AUTHORITY)

***Increased commercial use***

As far as total tonnage transported is concerned, the segment of the Seaway between Montreal and Lake Ontario has recorded a substantial increase compared with the preceding canal system. From 8.8 million tons of goods transported through the 14 foot (4,2 m) canals in 1958, tonnage increased 20.6 million tons the first year the Seaway was in operation and reached a high of 63.3 million tons in 1977. As for the nature of Seaway freight, it is known that most of it is bulk goods since iron ore and grain account for 75 per cent of Seaway traffic. Lake boats, with a capacity of some 25 000 tons, are filled with grain at the various ports on Lake Superior and then head for the storage silos at Montreal, Trois-Rivières, Quebec City and even Baie Comeau and Port Cartier. On their return voyage, these same vessels are loaded with iron ore from Quebec-Labrador at Sept-Îles, Pointe Noire and Port Cartier which they carry to the Canadian and American steel mills located in the Great Lakes region.

Even though the Seaway also provides access to oceangoing vessels, these vessels ply the Seaway's waters less often than the promoters of the Seaway had hoped. This is explained by the fact that, compared with lake ships, the oceangoing vessels have a smaller load capacity in relation to their tonnage, a capacity of barely 9000 to 10 000 tons of goods as opposed to 27 000 to 28 000 tons for the Great Lakes freighters. The Great Lakes freighters transported as much as 71 per cent of the commercial tonnage on the Montreal-Lake Ontario section in 1976.

While no one would deny that the opening of the Seaway did result in increased annual tonnage transported on this part of the St. Lawrence, statistics show that it also brought about a decrease in the annual growth rate of tonnage handled by the harbours in Quebec to the profit of Canadian and American harbours on the Great Lakes. This fact explains in part the Quebec Government's reservations with respect to the construction and operation of the St. Lawrence Seaway.

***Opposition to the project***

While Quebec's reservations can be interpreted as passive opposition to the project, arguments in the United States were much more radical. Already present in 1895, the forces of American opposition later crystallized around the National St. Lawrence Project Conference, a huge national organization that included more than 250 groups in 1950. Naturally, railroad companies were among the principal adversaries to the project, but so too were the Atlantic and Gulf of Mexico harbours, coal companies, railwaymen's and miner's unions, and several American cities and states. On the other hand, the Province of Ontario and the State of New York, drawn by the promise of securing a major source of hydro-electric power, came down on the side of the Seaway project's most ardent promoters. This latter group received the support of the Canadian Government and American Presidents.

## THE FUTURE

The St. Lawrence Seaway was completed in 1959. Since then some improvement works already took place. A by-pass canal was built between 1967 and 1973 on the Welland Canal to achieve a thirty minutes saving in a ship's passage. That constitutes an appreciable gain in monetary terms. Will there be attempts now to prolong the sailing season on the Seaway to the full twelve months of the year? Will there be attempts to create new type of ships or tugs? Will the Government build a fifth system of canals on the St. Lawrence at the beginning of the 21th century? How is it possible to answer these questions in days when technological changes are unfolding at great speed? If maritime transportation does not become obsolete, the St. Lawrence River will assuredly see new works along its shores to adapt the waterway to the needs of modern transporters.

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CANADIAN ECONOMIC HISTORY, Macmillan, Toronto, 1967.

Creighton, Donald
THE EMPIRE OF THE ST. LAWRENCE, Macmillan, Toronto, 1970.

Hamelin, Jean and Yves Roby
HISTOIRE ÉCONOMIQUE DU QUÉBEC 1851-1896, Fides, Montreal, 1971.

Ouellet, Fernand
ECONOMIC AND SOCIAL HISTORY OF QUEBEC 1760-1850, Fides, Montréal, 1971.
These studies tend to provide only general information on the building of the canals; however, each one does draw a parrellel between developments in politicial and economic conditions and developments in transportation.

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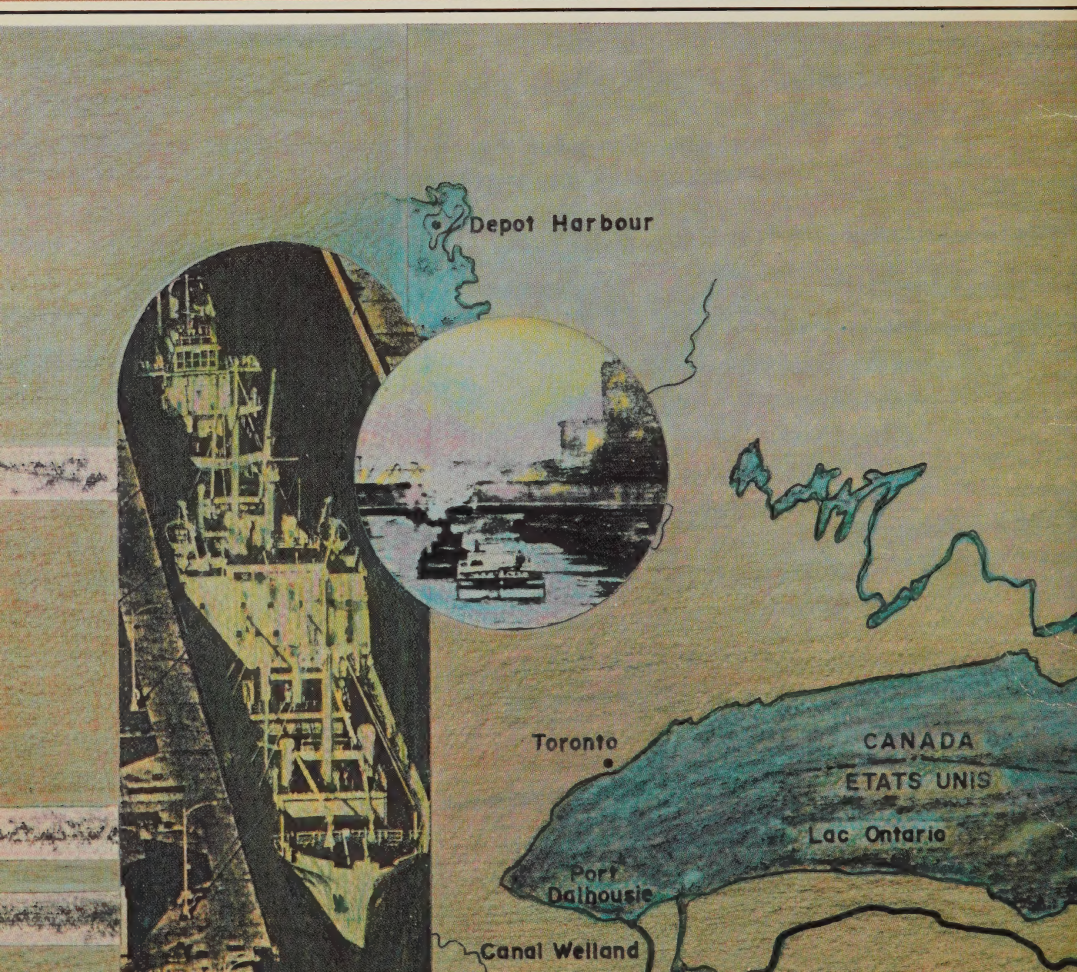
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